NON-PUBLIC?: N
ACCESSION #: 8712030372

LICENSEE EVENT REPORT (LER)

FACILITY NAME: St. Lucie Unit One PAGE: 1 of 5

DOCKET NUMBER: 05000335

TITLE: Reactor Trip Due to Loss of Condensate Pump Due to Inadequate Procedure and Spurious High Startup Rate RPS Actuation Due to Electrical Spike
EVENT DATE: 10/29/87 LER #: 87-016-00 REPORT DATE: 11/30/87

OPERATING MODE: 1 POWER LEVEL: 020

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR SECTION
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:
NAME: J. M. Powell, Shift Technical Advisor TELEPHONE #: 305-465-3550

COMPONENT FAILURE DESCRIPTION:
CAUSE: X SYSTEM: JC COMPONENT: JX MANUFACTURER: C490
REPORTABLE TO NPRDS: YES

SUPPLEMENTAL REPORT EXPECTED: No

ABSTRACT: On October 29, 1987, at 0334 hours, St. Lucie Unit One was in Mode 1 (reactor power greater than or equal to 5%, average coolant temperature greater than or equal to 325 F), when the Unit tripped on Low Steam Generator Level due to the loss of the 1A condensate Pump. Feedwater was restored to the steam generators by the manual starting of the Auxiliary Feedwater Pumps. All systems functioned normally.

At 0542 hours, the unit was in Mode 3 (reactor not critical, RCS Temperature greater than or equal to 325 F) preparing to return to full power operation, with the C channel of Wide Range Nuclear Instrumentation on the Reactor Protection System (RPS) placed in trip condition in accordance with Technical Specification 3.3.1.1. The licensed Reactor Control Operator had just begun pulling the initial group of Shutdown Control Rods when a spurious signal was received on the B channel wide range nuclear instrumentation and the reactor was tripped on High Startup Rate. All systems functioned normally.

The root cause of the loss of the condensate pump was determined to be an

inadequate operating procedure. The root cause of the High Startup Rate trip was determined to be electrical noise.

Corrective actions include:
- revising the inadequate operating procedure
- the plant Training department will review the loss of the condensate pump to determine the appropriate training methods and requirements
- removing the inoperable B channel from service and placing it in tripped condition
- repairing the B channel.

(End of Abstract)

DESCRIPTION OF EVENT

On October 29, 1987, at 0300 hours, St. Lucie Unit One was in Mode 1 (power greater than or equal to 5%, average coolant temperature greater than or equal to 325 F), preparing to return to full power operation. Power had been reduced the previous day to correct a vibration problem on the number nine bearing of the low pressure turbine. The C channel wide range nuclear instrumentation on the Reactor Protection System (RPS) (EEIS:JC) was out of service, and had been placed in tripped condition in accordance with the requirements of Unit One Technical Specification 3.3.1.1, Table 3.3-1, action statement 2. Feedwater was being supplied to the steam generators by the 1B Main Feedwater Pump (MFWP) (EIIS:SJ) and the 1A Condensate Pump (EEIS:SD). A leak had been found on a seal on the 1B Condensate Pump, and the pump had been removed from service. Preparations were underway by plant Operations and Electrical Maintenance personnel to place the 1C pump in service prior to returning the unit to full power operation.

At 0315 hours, utility Operations personnel (two non-licensed turbine operators and a licensed Nuclear Watch Engineer) were experiencing difficulty in making the 1B to 1C pump transfer. The local control panel for the three condensate pumps consists of two key operated transfer switches. There are three keys used to operate these switches, one for each pump. The purpose of the keys is to ensure that the 1C Condensate Pump, and installed spare which can be powered from either the A or B pump breaker, is prohibited from being powered from both sources at the same time. An electrical key release captures the key for the C pump in either of the two switches to ensure that it is powered from only one breaker. At the St. Lucie Plant, this transfer switch arrangement is unique to the condensate pump breakers.

Unaware that the circuitry on the transfer switches would capture the C pump key, the operators were concerned that there might be a problem with the pump

breaker when they could not remove the C key from the switch. An Electrical Maintenance supervisor was called by the Nuclear Watch Engineer to aid in troubleshooting. In the course of this effort, the A key was inserted in the 1A pump transfer switch interlock and turned, resulting in the removal of power to the 1A Condensate Pump at 0334 hours. The 1B MFWP tripped on low flow less than one-half second later, and the reactor was tripped approximately 20 seconds later on low steam generator water level. All plant systems functioned normally. Feedwater was immediately restored to the steam generators by the licensed Reactor Control Operators in the Unit One Control Room by manually starting the Auxiliary Feedwater electric pumps; the unit was quickly stabilized in Mode 3.

Two hours later, at 0540 hours, the Unit was in Mode 3 (reactor not critical, average coolant temperature greater than or equal to 320 F). The licensed Reactor Control Operators on shift had begun to withdraw the control rods in Shutdown Group A from the core, when a spurious spike was received on the B channel wide range nuclear instrumentation of the RPS. Because the C channel was out of service and placed in a tripped position as per the requirements of Technical Specification 3.3.1.1, the two-out-of-four actuation logic was made up, and the RPS actuated on a High Startup Rate signal at 0542 hours. Criticality had not been achieved at the time of the trip. All plant systems functioned normally, and the plant was stabilized in Mode Three by 0545 hours.

CAUSE OF EVENT

Loss of Condensate Pump Trip

The root cause of the loss of the 1A Condensate pump was due to the inadequacy of the procedure which addresses transferring power from either the 1A or the 1B Condensate pump to the 1C Condensate pump. Several steps which must be performed when actually making the transfer were not mentioned in the procedure, nor was there any mention of the potential for tripping a pump when inserting any key in any of the various switches. In addition, the breaker/key switch arrangement used for the installed spare Condensate Pumps on both St. Lucie Units is unique to those pumps, and very rarely used.

Spurious High Startup Rate Signal

The root cause for the High Startup Rate Actuation was determined to be spurious electrical noise on the B wide range instrumentation channel. No other channels were found to have actuated at the time the B channel received the high startup rate signal.

ANALYSIS OF EVENT

Loss of Condensate Pump Trip

This event was deemed reportable as per the requirements of 10 CFR 50.73.a.2.iv, any event or condition that results in the manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protective System (RPS). The event was compared to the Loss of Normal Feedwater Flow Event as described in Chapter 15.2.8 of the St. Lucie Unit One FUSAR. The FUSAR analysis assumes a initial condition of full power operation, while the unit was in Mode 2 at the time of the event. No operator action is assumed in the FUSAR for at least ten minutes; however, actual operator response was fast enough to preclude automatic Auxiliary Feedwater System acuation. Therefore, it can be concluded that the health and safety of the public were not threatened at any time during this event.

High Startup Rate RPS Actuation

This event was deemed reportable as per the requirements of 10 CFR 50.73.a.2.iv, any event or condition which results in the manual or automatic actuation of any Engineered Safety Feature, including the Reactor Protection System. The event was compared to the Uncontrolled CEA Withdrawal Event as described in Section 15.2.1 of the St. Lucie Unit 1 FUSAR, and more specifically to the Uncontrolled CEA Withdrawal from a Subcritical or Low Power Startup Condition. The analyzed event determined that a significant increase in reactor power did not result from the uncontrolled withdrawal of control rods until approximately 1% power was reached, and was determined to be bounded by the over-pressurization event detailed in section 15.2.1.2 of the FUSAR. As the reactor had not achieved criticality at the time the spurious signal was received, the actual event is bounded by the analyzed event. Therefore, it can be concluded that the health and safety of the public were not threatened at any time during this event.

CORRECTIVE ACTIONS

Loss of Condensate Pump Event

1. Immediate corrective actions taken were to restore the 1A Condensate Pump to service and to place the 1C pump in service.

2. The Feedwater and Condensate System Operating Procedure is being revised.

3. The plant training department will review this event to determine the appropriate training requirements and methods.

High Startup Rate Event

1. Immediate corrective actions included verifying that the RPS actuation was spurious, and resetting the actuated channels.

Long term corrective actions taken as the result of this event include the following:

2. The C wide range nuclear instrumentation channel was returned to service.

3. The B channel was placed in a tripped condition as per the requirements of Technical Specification 3.3.1.1, and is scheduled for repair.

ADDITIONAL INFORMATION

Loss of Condensate Pump Event

All components functioned normally during this event.

For a previous event involving a manual reactor trip due to the loss of a condensate pump, see LER 389-84-012.

Spurious High Startup Rate RPS Actuation

With the exception of the RPS B channel wide range nuclear instrumentation, all components functioned normally during this event.

For a previous similar event, see LER #335-82-04, which discusses a malfunction in the C channel of the wide range nuclear instrumentation.

P. O. BOX 14000, JUNO BEACH, FL 33408-0420

FPL

NOVEMBER 30, 1987
L-87-493
10 CFR 50.73

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, D. C. 20555

Gentlemen:

Re: St. Lucie Unit 1
Docket No. 50-335
Reportable Event: 87-16
Date of Event: October 29, 1987
Reactor Trip Due to Inadequate Procedure and Spurious
High Startup Rate Actuation Due to Electrical Spike

The attached Licensee Event Report is being submitted pursuant to the requirements of 10 CFR 50.73 to provide notification of the subject event.

Very truly yours,
/s/ J. K. Hays for
C. O. Woody
Executive Vice President

COW/GRM/gp
Attachment
cc: Dr. J. Nelson Grace, Regional Administrator,
Region II, USNRC
Senior Resident Inspector, USNRC, St. Lucie Plant

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